

DESCRIPTIONS OF NEW AUSTRALIAN BLOOD-
SUCKING FLIES BELONGING TO THE
FAMILY LEPTIDÆ.

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(Communicated by Dr. J. B. CLELAND.)

[With Plate XXVI.]

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THE existence of blood-sucking Leptid flies in Australia was first discovered by Dr. Cleland in June, 1911, on a branch of Middle Harbour, Sydney. Specimens taken on this occasion were forwarded to Mr. E. E. Austen of the British Museum, who found that they belonged to the Leptidæ and represented two (apparently) undescribed species. Subsequently specimens were obtained from Helensburgh, (Dr. Cox), and also from the Hawkesbury River. Unfortunately, with the exception of a few from the Hawkesbury River the laboratory collection does not now contain any of these specimens.

In 1914, Arthur White in his paper on the Diptera-Brachycera of Tasmania, described a species from Freycinet Peninsula, Tasmania, and named the genus *Spaniopsis*. His species—*S. tabaniformis* White, is however, different from any we have met in New South Wales.

In March, 1915, I obtained specimens of one species from the Hawkesbury River, on the heights surrounding the dam on the mainland from which the water supply of Milson and Rabbit Islands is derived. This proved to be the same as the specimens already in the collection from

the same locality. Further specimens of this species had been received in January from Mount Irvine, (Mr. Darnell Smith), and in March a specimen was received from Wentworth Falls, (Miss Smith). A second species was discovered on Milson Island, Hawkesbury River on April 10th. It was present in considerable numbers though not noticed on the week ends immediately preceding and following this date. On May 24th Dr. Cleland met with two further species on the Mangrove Mount Road near Gosford. A single specimen of one of these was taken by myself at Milson Island on June 3rd, while the other was met with by Dr. Cleland near Mount Wilson on June 5th. With the exception of *S. clelandi* which occurs on the mountains in summer, all the species are autumn or winter species and possibly only come out for a limited period. They are all bush flies and are found on the sandstone ridges and not in the gullies.

The discovery of a genus of Leptidæ whose members all, so far as known, possess the blood-sucking habit, is of interest, not only from the potentialities of the species for conveying disease, but also because blood-sucking flies belonging to this family are extremely rare in other parts of the world. According to Austen there are four blood-sucking species belonging to three genera. Of these, *Symphoromyia* is an American species, *Leptis scolopacea* and *L. strigosa* are found in France and appear only occasionally to suck blood, while the fourth species—*Trichopalpus obscurus*—is a Chilian species.

Only female specimens of *Spaniopsis* have so far been obtained, and the blood-sucking habit appears to be confined to this sex. Austen states that both sexes of *L. scolopacea* are said to have been observed to bite in France, though neither has been known to do so in the British Isles. When attacking for the purpose of blood-sucking,

the flies hover principally around the head, although they will settle on any portion of the body. When flying around the head they do so much in the same manner as the common bush fly *Musca vetustissima*, but it was noted, both by Dr. Cleland and myself, that when flying in front where they can be seen, the action is much more like that of a mosquito. I allowed several specimens of *S. vexans* to settle on my hands and watched the act of biting. The body of the fly was kept parallel to the surface of the hand, the proboscis being vertical, with the labellæ spread apart. The fly in no case continued long at a meal, even when undisturbed, but did not seem to have been repleted. The "bite" was felt as a sharp prick, but left no smarting nor itching afterwards, and no lump was formed as the result of the bite. If the manner of feeding of these flies is an interrupted one, as my observations on *S. vexans* seem to indicate, they may prove to be of considerable importance as mechanical transmitters of disease. Several specimens of *S. vexans* were noticed on a calf which was confined in an open pen on Milson Island. They invariably selected the moist surface of the nose and lips to settle on; after remaining motionless, apparently biting, for a short time, a fly would crawl about the surface and then settle down again. When disturbed they flew away, and the mosquito-like action was distinctly observed. Several specimens of *Stegomyia aripes* Skuse were biting at the same time and also selected the same portion of the nose and lips, and in flying, unless they are clearly seen, it was often hard to distinguish between the mosquito and the Leptid.

Very probably these flies will prove to have a wide distribution, at any rate along the coastal districts of eastern Australia, but so far they have not been met with west of the mountains. It has been suggested that these flies may have a causal connection with Bung Eye. I do not, however, think that this is likely. Bung Eye is more prevalent

in the inland parts than on the coast; it is also almost, if not entirely, confined to the summer months. *Spaniopsis* on the other hand is, so far as known, a coastal and mountain genus, and also seems to appear during the winter months. I have reason to think, however, that Bung Eye is probably more prevalent in the neighbourhood of Sydney than is generally thought. Over sixty cases occurred among the patients at Rydalmere Hospital for the Insane during three months in the beginning of the summer of 1912-13. I have also been informed that Bung Eye was exceedingly common among the men engaged in building the dam on the Hawkesbury River, on the mainland opposite Milson Island, in a locality where these flies have been taken on several occasions. Bung Eye also occurs at Mount Irvine in the Mount Wilson district, a locality whence these flies have been obtained.

The four species now to be described are all closely allied *inter se* and to *S. tabaniformis*, but can readily be distinguished by difference in size, length of arista and colouration of legs and of the ventral surface. They all exhibit the generic characters described by White in the antennæ and wing venation.

The term arista applied to the process of the third antennal joint seems to my mind somewhat misleading; it is rather a prolongation of the third joint itself. Its length varies in different species and reaches its greatest development in *S. longicornis*. In *S. vexans* and *S. marginipennis*, the discal cell varies in different specimens or on the two wings of the same specimen; in some there is a distinct angulation below, in others this is rounded off; in some the third veinlet is present as a very short stump, in others it is absent and the angulation from which it arises is rounded off. The minute veinlet inside the cell at the lower angulation described by White, was also noted in some of my

specimens. *S. clelandi* and *S. longicornis* differ from the other species in always having the third veinlet present, extending nearly or quite half way to the wing margin; the angulation below is also variable in these species.

In *S. tabaniformis*, White figures the anal cell as closed in the wing margin; in all the species before me, the anal cell is closed just before the margin to which it is united by a short stem.

In one particular all the new species differ from White's description of the genus. The tibiae are described as not having distinct spurs, although in White's description of the family Leptidæ the posterior¹ tibiae are stated to be spurred. In all the species herein described the middle tibiae possess two distinct spurs, one of them slightly larger than the other.

The following table should enable the known species to be readily differentiated.

Table of Species.

- a. Legs yellow, venter yellowish.
 - b. Wings hyaline.
 - c. Large species (5 mm.) = *S. tabaniformis* White.
 - cc. Small species (3 mm.) = *S. vexans*, n.sp.
 - bb. Wings with anterior margin infusate in outer half
 - = *S. marginipennis*, n.sp.
- aa. Legs bicolorous; venter dark grey.
 - d. Size medium (4 mm.), arista of moderate length (4 mm.)
 - = *S. clelandi*, n.sp.
 - dd. Size large (5.5 mm.), arista long (.8 mm.)
 - = *S. longicornis* n.sp.

The types of the new species are in the collection of the Microbiological Laboratory, Department of Public Health.

¹ It is possible that "posterior" is here a misprint for "middle," as Williston places spurred middle tibiae among the characters of the family.

Cotypes have been deposited in the Australian Museum. I am indebted to Miss Phyllis F. Clarke for the drawings which accompany this paper.

SPANIOPSIS TABANIFORMIS, White.

Plate XXVI, fig. 11.

White, Royal Society of Tasmania: Papers and Proceedings, 1914, p. 44, fig. 2.

For an opportunity of examining a co-type of White's species, I am indebted to Mr. W. J. Rainbow of the Australian Museum.

The species is closely allied to the other members of the genus, and most closely to *S. vexans*. The colour of the ventral surface is not mentioned by White, but in the specimen before me, is of a greyish-yellow. This, in combination with the yellow legs, brings it close to *S. vexans*, from which it can be readily distinguished by its much larger size. The wings in this specimen appear slightly clouded along some of the veins, much as in some specimens of *S. clelandi*. This may not be constant; it is always slight in amount and seen only from certain directions. The anal cell is closed immediately before the wing margin to which it is united by a short stem. The intermediate tibiae are spurred as in the other species.

SPANIOPSIS VEXANS, n. sp.

Plate XXVI, figs. 6, 10.

♀ Resembling *S. tabaniformis* but considerably smaller. Thorax brownish with three darker longitudinal lines; abdomen dark brown with narrow paler apical bands; venter yellow; legs yellow; tarsi infusate.

Face light grey, front dark brown. Proboscis black. Palpi yellow. Antennæ black; first and second joints short, the second joint rather shorter than the first, third joint

broadened, almost as wide as long, somewhat concave on its inner surface, produced into a short stout arista, not quite as long as the rest of the antenna. Thorax yellowish-brown, sides and anterior margin with a greyish bloom, with three darker longitudinal lines, not quite reaching base, the median line slightly narrower and not extending quite as far as the others. Abdomen dark brown, the basal segment lighter, each segment with a narrow light yellowish-brown apical border, the apical segment almost entirely of this colour. Ventral surface yellow. Legs pale yellow, tarsi with first joint infusate at apex, the other joints dark, intermediate tibiae with two apical spurs. Wings with venation characteristic of genus, the third veinlet very short or absent, the angulation below variable; hyaline, veins and stigma dark brown. Length 3 mm.; antennæ .55 mm., third joint .17 × .14 mm., arista .26 mm.

Hab. New South Wales, Milson Island (Hawkesbury R.)

This species was taken on two successive days, April 10th and 11th, and was not noticed a week previous or a week after this date. It is the smallest species known, and can readily be distinguished by the combination of small size, yellow legs and yellow venter. The species was fairly abundant when taken and was noticed to be attacking cattle on the island. About thirty specimens were taken, but unfortunately almost all turned black after being pinned.

SPANIOPSIS MARGINIPENNIS, n. sp.

Plate XXVI, figs. 2, 4, 8.

♀ Similar to *S. tabaniformis*, but with wings infusate along outer portion of anterior margin. Thorax brownish with three darker longitudinal lines; abdomen dark, with paler apical bands; venter yellow; legs yellow, tarsi infusate.

Face light grey, front dark brown. Proboscis black. Palpi yellow. Antennæ black; first and second joints small, third joint broadened, longer than wide, terminating in a long thick arista, not quite twice as long as rest of antenna. Prothorax brown, with a somewhat yellowish tint, sides and apex with a greyish bloom; with three darker longitudinal lines, not quite reaching base, the median the narrower. Scutellum brown. Abdominal segments dark brown, bordered apically with a moderately broad greyish-yellow band interrupted in the middle, apical segment greyish-yellow with a median dark spot. Venter light greyish-yellow, sides similarly coloured. Legs pale yellow, tarsi with first joint infusate at apex, the other joints dark; intermediate tibiae with two apical spurs. Wings with characteristic venation, the third veinlet very short or absent, the angulation below variable; deeply infusate along anterior margin from inner end of stigma to apex of wing; stigma dark brown or black, veins dark brown, yellowish at base. Length 4.5 mm., antennæ .97 mm. third joint .22 × .15 mm.; arista .6 mm.

Hab. New South Wales, Gosford, (J. B. Cleland, 24/5/15), Milson Island (E. W. Ferguson, 3/6/15).

This species may be readily identified by the dark anterior margin of the wings. The dark portion is moderately broad and fades away below, but its lower border is fairly sharply defined. The arista is considerably longer than in *S. vexans*, to which it is most nearly related in its yellow venter and legs. The specimens were taken by Dr. Cleland in company with *S. longicornis* on the Mangrove Mountain Road behind Gosford, and were captured while trying to bite.

SPANIOPSIS CLELANDI, n. sp.

Plate XXVI, fig. 5, 9.

♀ Of medium size. Thorax brown with three darker longitudinal lines; abdomen dark brown with lighter apical bands; venter darker grey; legs bicolorous.

Face grey; front dark brown. Proboscis black. Palpi dark brown. Antennæ black; basal joints short, third joint broadened, arista about as long as rest of antenna, the whole antenna about the same length as the arista in *S. longicornis*. Thorax dark brown with a greyish bloom at apex and on sides, with three darker longitudinal lines, the median not reaching base. Scutellum brown. Abdominal segments dark brown with moderately broad, greyish apical bands, somewhat undulate but not interrupted in the middle, basal segment almost entirely greyish, the two apical segments greyish with a median basal dark spot. Venter and sides dark grey. Legs bicolorous; tibiae light yellowish-brown, apex darker; tarsi with first segment yellowish-brown, darker at apex, other joints dark. Wings with characteristic venation; third veinlet constantly present, moderately long, reaching about one-third of the way to the costal margin; anal cell closed immediately before margin; hyaline, veins and stigma dark, a very faint infuscation traceable along the course of the veins in some specimens. Length 4 mm.; antennæ .87 mm.; third joint .26 × .19 mm.; arista .43 mm.

Hab. New South Wales, Hawkesbury River (March), Mount Irvine (January), Wentworth Falls (March).

Allied to *S. longicornis*, but with shorter antennæ and shorter arista; the third joint is also differently shaped. This species may be separated from the other members of the genus by the colour of the legs.

Several specimens without locality label and in a bad condition are in the collection—some of these may be from Middle Harbour or Helensburgh, but I think they are all Hawkesbury River specimens. The Blue Mountain specimens are also in bad condition, having turned black, but I have no doubt they are referable to this species. The slight infuscation along the veins is very faint and difficult

to trace—it seems absent in some specimens. One specimen without locality, in the collection, has the veins much lighter, almost yellowish in colour; it is possibly distinct, but is an old specimen and may have faded; unfortunately both antennæ are broken.

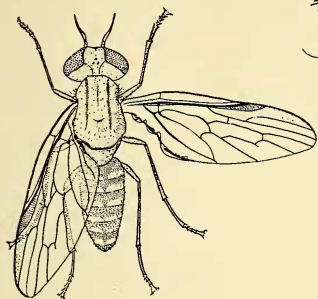
I have much pleasure in naming this species after Dr. J. B. Cleland who was the first to discover these flies.

SPANIOPSIS LONGICORNIS, n. sp.

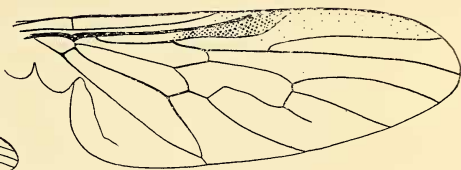
Plate XXVI, figs. 1, 3, 7.

♀ Size comparatively large for the genus; most nearly allied to *S. clelandi*. Antennæ with long thick terminal arista; thorax dark greyish-brown with three longitudinal darker lines, and an interrupted dark line at sides; abdomen dark brown with paler apical bands to segments; venter darker grey; legs bicolorous; wings hyaline.

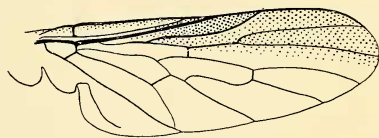
Face light grey; front dark brown. Proboscis black. Palpi yellow. Antennæ black, very long, basal joints short, third joint twice as long as wide, terminating in a long thickened arista, not quite twice as long as the rest of the antenna. Thorax greyish-brown with three darker longitudinal lines, the median narrower than the others, the two submedian apparently connected at the base, also with an interrupted dark line near side, connected across with submedian line at apex and at level of transverse suture. Scutellum brown. Abdomen dark brown with a broad greyish band at apex of segments, interrupted in middle, basal and apical segments greyish. Venter and sides dark grey. Legs bicolorous; femora brown, the anterior pair almost black, with the base and apex of a lighter more yellowish colour; tibiae yellowish, slightly darkened at apex; tarsi with basal joints yellowish, infuscate at apex, the other joints dark. Wings hyaline, veins black, stigma brownish; venation as in genus, third veinlet always present, longer than in *S. tabaniformis*, reaching almost



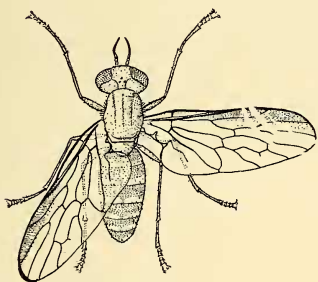
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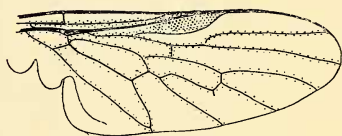
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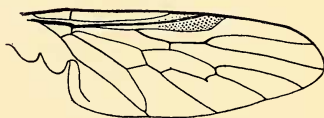
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